probably a secondary action since after large doses the vaso-motor centre becomes involved.

3. In ascending the chinoline series, the physiological action changes in character, the lower members seeming to affect the sensory encephalic centres and the reflex centres of the cord, destroying voluntary and reflex movement; the higher members seeming to affect chiefly the motor centres, causing violent convulsions, and afterwards paralysis.

4. Speaking of these series of bodies, the mere knowledge of the constituent elements of a body is no guide to its physiological action.

5. Speaking of these series of bodies, the base, and not the acid with which it may happen to be united, determines within slight limits, the physiological character of the compound.

6. The union of methyl, ethyl, amyl, and allyl with chinoline does not entirely change its characteristic mode of action, but their presence causes a tendency to spasm and convulsion. Also in the case of the pyridine and picoline substitution compounds, increase of molecular complexity and weight does not indeed entirely change the mode of action of the simpler compound, but is always attended by a tendency to spasm and convulsion.

7. When the bases of the pyridine series are doubled by condensation, producing polymers such as dipyridine, &c., they not only become more active physiologically, but the mode of action of the condensation product differs from that of the simpler base.

Saturday was entirely taken up by excursions into the surrounding counties, Lancashire, Cheshire, and Derbyshire.

Throughout the week facilities were given to members of the Association to visit the various hospitals, libraries, manufactories, and buildings of interest in the town and neighbourhood.

OUR BOOK SHELF

Jainism; or, the Early Faith of Aṣoka. By E. Thomas, F.R.S. (London: Trübner and Co., 1877.)

THIS is a book which will be of great interest to orientalists and students of the science of religion and is likely to occasion a good deal of controversy. It embodies two articles published by the author in the *Journal* of the Royal Asiatic Society, the first of which endeavours to show that the Greek monograms on Bactrian coins represent dates, the hundreds being omitted in imitation of the Hindu *loka kala*, or as when we write '77 for 1877. The dates, Mr. Thomas thinks, refer to the Seleucid era (B.C. 312), and we are therefore able to place the Indo-Scythian dynasty of Kanishka, whose monuments at Mathurâ have recently been discovered, from B.C. 2 to A.D. 87. The second article challenges the usual opinion that Jainism is a late corrupt form of Buddhism and seeks to prove that Buddhism itself was originally a Jainist sect and that Aṣoka, the Constantine of India, was a Jainist before he was a Buddhist. His grandfather, Chandra Gupta or Sandracottus, is claimed by the Jainists, and their claim is supported by the testimony of Megasthenes; according to Abúl Fazl, Aṣoka himself introduced Jainism into Kashmir, and the gradual passage of his belief from Jainism to Buddhism may be detected in his rock and pillar edicts. The Bhabra edict, late in his reign, first contains positive Buddhism, and his earlier Jainist title of *Devânampiya* or "beloved of the gods," is dropped as incompatible with a creed which denied the existence of any God at all. The Mahâwanso has allowed a reference to "the twenty-four supreme Buddhos"—the number of the Jainist saints—to remain in its text, and the symbols of the Buddhas are borrowed from their Jainist prototypes. The existence of Jainism at the beginning of the Christian era is proved by the recent discoveries at Mathurâ, where the figures are nude as among the Jainists, not clothed as among the Buddhists, and the Kanishka coins lately found at Peshâwar are further evidence of Saivism and the worship of many deities, Indian, Persian, Greek, and even Roman, but not of atheistic Buddhism. It may be added that Mr. Thomas believes that in these Kanishka coins we have evidence of the soldiers of Crassus having been settled in the extreme north-west of India.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Rainbow Reflected from Water

ON Monday last, August 6, at 7 P.M., I was standing at the end of Eastbourne Pier looking towards the sea. Behind me the sun was low on the horizon but shining brightly, overhead and out to sea rain was falling from somewhat broken masses of clouds. In front a brilliant rainbow formed a complete semicircle, the two ends apparently resting on the sea, and outside the principal bow the secondary arc was shining with considerable intensity. The sea was calm, but its surface was by no means glassy, being ruffled over with minute wavelets. Reflected from the surface of the sea, and extending in a broken curved line from the extremities of the rainbow nearly up to the pier, was a complete reproduction of the colours in the sky; the reflection, bearing in mind the ruffled surface of the water, being perfect. Not only were the colours of the primary bow reproduced, but a faint reflection of the secondary bow could be detected, whilst the dark space between the two bows, and the luminous haze which always extends for some distance from the concave edge of the primary bow, were distinctly reproduced.

The intensity of the reflected image was, as near as I could judge, one-fourth that of the actual bow. Near the horizon when the real and reflected arcs seemed to touch, there was a decided displacement of the colours, as if the diameter of the reflected bow was somewhat less than that of the original. In other words, the reflected red was not accurately in line with the red in the real bow, but appeared to line with the yellow, whilst the yellow of the reflected arc seemed a continuation of the green in the actual rainbow.

I regret that I had no polarising apparatus with me.

August 8 WILLIAM CROOKES

Science Lectures in London

IT has occurred to me, while reading some lectures given in Glasgow and Manchester, that were such lectures given in London during the winter months, they would confer a great boon upon a large number of people.

Perhaps, Sir, if you were to propose such a thing through the medium of your valuable paper, some might be found to bring about such a result, as I believe no difficulty would be found in forming a society such as the Glasgow Science Lecture Association.

I hope some abler pen will be found to take up the subject.

Herne Hill, August 7 L. JEANS

Strange Dream Phenomenon

I HAVE just experienced almost as remarkable a coincidence as those adduced by Sir W. Hamilton to prove the activity of consciousness even in sleep.

I had not been to rest for forty-one hours, and was overcome by sleep while in the act of writing a short diary I am in the habit of keeping. During the time I was asleep, I dreamed of some house property in Brighton, a dream purely fictitious and very remote from anything I had previously thought of. Awakening in a short time (scarcely a minute), I found myself still writing; and on further examination I discovered that I had, following the current of my thoughts, written as much of my dream as time had allowed. J. VINCENT ELSDEN

Edelweiss

As an old Alpine man, let me say that Edelweiss is not localised in any part of the Alps; I have found plenty of it at far less altitudes than the natives sometimes try and make awe-stricken tourists believe.

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Your paragraph is otherwise correct, more so than one in a contemporary which said that Italian herdsmen were exterminating the flower; *they*, at all events, are not likely to show such Alpine prowess. MARSHALL HALL

Scientific Club, 7, Savile Row, W., August 13

OUR ASTRONOMICAL COLUMN

THE COLOURS OF *α* URSÆ MAJORIS AND ARCTURUS.—Mr. T. W. Backhouse, writing with reference to the periodical change of colour in *α* Ursæ Majoris, indicated by the observations of Herr Weber, of Peckoloh, of which mention was made recently in this column, remarks that after watching it for several months he concludes the variation must be very slight. Mr. Backhouse observed with a small binocular, power $2\frac{1}{2}$, with which he estimated the depth of colour as compared with *β* Ursæ Majoris and *β* Ursæ Minoris, which are respectively bluish and deep orange, not the actual colour of the star. Representing the difference between the two stars of comparison by a scale from 0 to 1, "the depth of colour of *α* Ursæ Majoris only varied from $\frac{4}{7}$ to $\frac{3}{4}$ on this scale, so that the whole range of its variations was less than $\frac{1}{5}$ of the difference between those two stars, probably not greater than can be accounted for by errors of observation. The greatest depth of colour, assuming *β* Urs. Maj. and *β* Urs. Min. not to vary, was observed on January 6, March 18, and April 11, which are not long after Weber's times of minimum." Mr. Backhouse adds that if any period is indicated by his observations, it is more likely to be one of three months than any other.

Herr Weber observed with a Steinheil achromatic of $2\frac{2}{3}$ inches aperture and $3\frac{1}{2}$ feet focal length, power, 90. For details the reader may consult *Astron. Nach.*, Nos. 1663 and 1773.

Writing on the subject of periodical variation in the colour of a fixed star, we recall some observations by Prof. Julius Schmidt, now director of the observatory at Athens, published upwards of twenty years since, from which he concluded that a very marked change of colour had taken place in the light of Arcturus at least in the year 1852, as compared with ancient observations, and indeed with quite recent ones. On March 21, 1852, while waiting for a meridian observation of Arcturus at the Observatory at Bonn, Prof. Schmidt remarked to his surprise, that this star, which for eleven years previously he had considered one of the most decidedly red stars in the heavens, was, to the naked eye, only yellowish white, or as he says, to speak more correctly, "matt graugelb." During the transit there was no ruddiness either in a dark or illuminated field, and on going out into the open air and comparing Arcturus with other stars of the first magnitude, he found it light yellow, even Capella showing more colour. A comparison with Mars, which he had often previously made since the year 1841, was no longer possible, as with reference to the colour of the planet, "Arcturus appeared as a white star." Thormann, on the same night, considered the star "a dirty yellow, like the colour of slightly tarnished brass." The star was often observed at Bonn in this year, and though Argelander was at first sceptical as to any variation of colour, at the end of March he was convinced that Arcturus "exhibited no deeper yellow tinge than Capella, and that red was entirely absent." On May 11 Schmidt considered there was hardly an appreciable difference in colour from that of Capella. He considered that the circumstance of the star having lost for a certain time in the year 1852 every trace of redness was no illusion, but was quite confirmed. Arcturus was one of the six ὑπόκιρροι or fiery red stars of Ptolemy, in which list Sirius, now without a trace of ruddiness, was also included.

The difficulty and uncertainty attending observations on the colours of the stars are considerable for reasons which are sufficiently obvious. There is, perhaps, no more striking instance of the little value attaching to isolated observations or observations not undertaken for the special object, than that afforded by the binary star *γ* Leonis, of which Struve says: "Est stella duplex in hemisphærio boreali pulcherrima et splendore et coloribus," and the colours he assigned in the "Mensuræ Micrometricæ," golden for the larger star, and greenish-red for the smaller one, have been repeated with trifling variation of terms by subsequent observers. Yet on the date of discovery of the duplicity of the star by Sir W. Herschel, February 11, 1782, we find he assigns for the colours "L. white, S. white, inclining a little to pale red," differences which, but for the reason just mentioned, might well countenance the idea of a total change in the colours of both components. It may be added that in *γ* Delphini, we have a very similar case.

THE SYSTEM OF 40 o^2 ERIDANI.—M. Camille Flammarion communicates some measures of 40 Eridani and its companions made early in the present year. For the epoch 1877·12, the following are the results of his observations:—

Stars AD	Position	148°·0	Distance	37″·2
AE	,,	339·2	,,	109·9
AB	,,	104·7	,,	81·5
BC	,,	130·0	,,	4″ ±

The secular proper motion of the star A is, according to

Struve, in R.A.	...	− 216″·8	... in Decl. ...	− 342″·3
Mädler, ,,	...	− 218·8	... ,, ...	− 347·0

And as M. Flammarion remarks on allowing for the proper motion of the principal star, Prof. Winnecke's measures at the epoch 1864·84 compared with his own, show that the stars D and E do not form part of the physical system of 40 Eridani. His measures of A B agree with Struve's in proving that B, while partaking of the great proper motion of A, is yet approaching it slowly. C continues its rapid retrograde change of position with respect to B, the distance remaining nearly the same, and if the stars be regularly measured with powerful instruments, we must soon have sufficient data for an approximation to the elements of the orbit. When some one of the southern observatories possesses a heliometer, and we do not know of any instrumental addition to an establishment in a more southern latitude from which results of greater interest and importance in this branch of astronomy can be expected, the determination of the parallax of 40 Eridani, and it may be added of *ε* Indi ought to be amongst the first objects to which it is devoted.

THE THIRD RADCLIFFE CATALOGUE OF STARS.—In the late Annual Report of the Rev. R. Main, the Radcliffe Observer, to the Board of Trustees, it is stated that considerable progress has been made with the compilation of the third catalogue founded upon observations made at this important astronomical establishment, from 1862 to 1870, and additional assistance is proposed for its speedy completion, though no definite time is assignable for publication. The number of stars contained in the new catalogue is 4,389, or nearly twice the number included in the "second Radcliffe Catalogue," which was the first issued by the present director. The same Report mentions that the planet Mercury had been meridionally observed thirty-nine times during the year ending with June, 1877, a large number considering the difficulty attending the observations; but it is not the first time that the Radcliffe observer has had occasion to report successfully in this direction; some few years since we believe as many as forty-five observations were secured with the transit-circle in the course of the twelvemonth.

NEW MINOR PLANET.—A telegram from M. Stephan announces the discovery of a small planet by M. Borrelly, at Marseilles, on the 11th inst. At 8h. 35m. its R.A. was 21h. 19m. 50s., and N.P.D. 105° 59′; tenth magnitude.

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